

Facility Specific Chloride Variance Data Sheet

Directions: Please complete this form electronically. Record information in the space provided. Select checkboxes by double clicking on them. Do not delete or alter any fields. For citations, include page number and section if applicable. Please ensure that all data requested are included and as complete as possible. Attach additional sheets if needed.

Section I: General Information

A. Name of Permittee: Maple Grove Estates Sanitary District
B. Facility Name: Maple Grove Estates Sanitary District
C. Submitted by: Wisconsin Department of Natural Resources
D. State: Wisconsin **Substance:** Chloride **Date completed:** December 2, 2020
E. Permit #: WI-0036552-06-0 **WQSTS #:** (EPA USE ONLY)
F. Duration of Variance **Start Date:** April 1, 2021 **End Date:** March 31, 2026
G. Date of Variance Application: October 18, 2018
H. Is this permit a: ☐ First time submittal for variance
☐ Renewal of a previous submittal for variance (Complete Section IX)

I. Description of proposed variance:

Maple Grove Estates Sanitary District has applied for a variance from the acute and chronic water quality standards for chloride contained in ch. NR 105, Wis. Adm. Code. The acute and chronic water quality criteria are 757 mg/L and 395 mg/L, respectively. Because there is no dilution provided by the receiving water, a wetland (Q7-10 = 0 cfs), the water quality based effluent limits (WQBELs) are set equal to the criteria—760 mg/L as a daily maximum and 400 mg/L as a weekly average (both limits rounded). Based on chloride effluent concentrations from the current permit term Maple Grove cannot meet either the daily maximum or weekly average chloride limits. Chloride interim limits of 1,015 mg/L as a daily maximum and 576 mg/L as a weekly average are proposed along with a requirement that the permittee implement its Chloride Pollutant Minimization Plan (PMP) that focuses on reducing chlorides discharged to the sewage collection system from the regeneration of residential and commercial (1 business) water softeners. The permittee will be required to submit Annual Chloride Progress Reports that indicate which PMP activities were performed each year of the permit term and that include an analysis of trends in chloride discharges (both concentration and mass).

J. List of all who assisted in the compilation of data for this form

Name	Email	Phone	Contribution
Phillip Spranger	phillip.spranger@wisconsin.gov	608-516-5969	Permit Drafter
Julia Stephenson	julia.stephenson@wisconsin.gov	608-785-9981	Compliance Staff
Ben Hartenbower	benjamin.hartenbower@wisconsin.gov	715-225-4705	Parts II D-H and J

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: Chloride (400 mg/L chronic toxicity criterion and 760 mg/L acute toxicity criterion)
B. List other criteria likely to be affected by variance: none
C. Source of Substance: Residential and commercial zeolite water softeners and inflow/intrusion of road salt in the winter months into collection system.
D. Ambient Substance Concentration: N/A (Streamflow = 0 cfs) ☐ Measured ☐ Estimated
☐ Default ☒ Unknown
E. If measured or estimated, what was the basis? Include citation. N/A (Streamflow = 0 cfs)
F. Average effluent discharge rate: 0.009 MGD **Maximum effluent discharge rate:** 0.110 MGD
G. Effluent Substance Concentration: 1-day P99 = 1,161 mg/L ☒ Measured ☐ Estimated
4-day P99 = 827 mg/L ☐ Default ☐ Unknown
mean = 563 mg/L

H. If measured or estimated, what was the basis? Include Citation. Flow rates and chloride concentrations are from June 2014 to December 2018 discharge data.	
I. Type of HAC:	<input type="checkbox"/> Type 1: HAC reflects waterbody/receiving water conditions <input type="checkbox"/> Type 2: HAC reflects achievable effluent conditions <input checked="" type="checkbox"/> Type 3: HAC reflects current effluent conditions
J. Statement of HAC: The Department has determined the highest attainable condition of the receiving water is achieved through the application of the acute and chronic variance limits in the permit, combined with a permit requirement that the permittee implement its Chloride SRM plan. Thus, the HAC at commencement of this variance is 1,015 mg/L as a daily maximum and 576 mg/L as a weekly average, which reflect the greatest chloride reduction achievable with the current treatment processes, in conjunction with the implementation of the permittee's Chloride SRM plan. The current effluent condition is reflective of on-site optimization measures that have already occurred. This HAC determination is based on the economic feasibility of available compliance options for the Maple Grove Estates Sanitary District at this time (see Economic Section below). The permittee may seek to renew this variance in the subsequent reissuance of this permit; the Department will reevaluate the HAC in its review of such a request. A subsequent HAC cannot be defined as less stringent than this HAC.	
K. Variance Limit: 1,015 mg/L daily maximum and 576 mg/L weekly average.	
L. Level currently achievable (LCA): 1,015 daily maximum and 576 mg/L weekly average	
M. What data were used to calculate the LCA, and how was the LCA derived? (<i>Immediate compliance with LCA is required.</i>) Discharge data from June 2014 to December 2018 was analyzed and the daily maximum variance limit was established at 105% of the 1-day maximum chloride concentration of representative data from that time period. The weekly average variance limit was established at the weekly average variance limit from the previous permit term because the 4-day P99 of representative data from June 2014 to December 2018 exceeded the variance limit in the current permit.	
N. Explain the basis used to determine the variance limit (which must be \leq LCA). Include citation. Subsections NR 106.82(4) and (9), Wis. Adm. Code, defines daily maximum and weekly average interim limitations. The daily maximum limitation may be either the 1-day P99 value or a value no greater than 105% of the permittee's 1-day maximum chloride concentration. The weekly average interim limitation may be either the 4-day P99 value or a value no greater than 105% of the permittee's highest weekly average concentration. The daily maximum interim chloride limitation is established at 1,015 mg/L, which is 105% of the 1-day maximum chloride concentration of 967 mg/L. The weekly average interim limitation of 576 mg/L is carried forward from the current permit since the 4-day P99 value calculated using discharge monitoring data reported during the current permit term of 846 mg/L is greater than the current weekly average interim limitation. Interim limitations may be no greater than the interim limitations from the previous permit. Discharge monitoring data from June 2014 to December 2018 was used in this analysis.	
O. Select all factors applicable as the basis for the variance provided under 40 CFR 131.10(g). Summarize justification below: <div style="float: right; text-align: right;"> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input checked="" type="checkbox"/> 6 </div>	
The use of a reverse osmosis system to remove chlorides from the wastewater was evaluated. The annual capital and operation and maintenance cost of the system was estimated to increase annual sewer user rates per household to 6.74% of Median Household Income (MHI). Without a variance, meeting the acute chloride water quality standard of 757 mg/L and the chronic chloride water quality standard of 397 mg/L would result in substantial and widespread adverse economic and social impacts within the District. Homes in the Maple Grove Estates Sanitary District are not served by a public water system. Each home has its own well. The cost of installing a centralized lime softening system to eliminate the need for individual water softeners was not evaluated because the annual capital and operation and maintenance cost of constructing and	

operating a public water supply alone would increase drinking water rates to 9.78% of MHI, resulting in substantial and widespread adverse social and economic impacts in the District.

Section III: Location Information

- A. Counties in which water quality is potentially impacted: La Crosse County
- B. Receiving waterbody at discharge point: Wetland Tributary to Pleasant Valley Creek
- C. Flows into which stream/river? Internally Drained Wetland How many miles downstream? 0 mi.
- D. Coordinates of discharge point (UTM or Lat/Long): Lat: 43.87694° N / Lon: 91.12262° W
- E. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the chronic criterion of the substance for aquatic life protection?
Approximately one mile

- F. Provide the equation used to calculate that distance (Include definitions of all variables, identify the values used for the clarification, and include citation):
Wetland (background flow of zero) flows into Pleasant Valley Creek. No streamflow information was provided on the creek, but about a mile downstream the creek flows into the Lacrosse River. At West Salem, which is a few miles upstream of the mouth of the creek, the 7Q10 low flow is 116 cfs. Given the small discharge rate from this facility, it is assumed the chloride criteria will be met via dilution after the creek reaches the La Crosse River. No calculation is needed due to the large amount of available mixing.

- G. What are the designated uses associated with the direct receiving waterbody, and the designated uses for any downstream waterbodies until the water quality standard is met?
The receiving water is classified as Limited Forage Fish Community at the point of discharge and then disperses into a large wetland complex. Under low flow conditions the effluent flow either is lost in the wetland through evapotranspiration or to groundwater seepage prior to reaching Pleasant Valley Creek.

- H. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody:

There are no other dischargers to the Wetland Tributary to Pleasant Valley Creek or to Pleasant Valley Creek.

Permit Number	Facility Name	Facility Location	Variance Limit [mg/L]
N/A			

- I. Please attach a map, photographs, or a simple schematic showing the location of the discharge point as well as all variances for the substance currently draining to this waterbody on a separate sheet

- J. Is the receiving waterbody on the CWA 303(d) list? If yes, please list ☐ Yes ☒ No ☐ Unknown the impairments below.

River Mile	Pollutant	Impairment
N/A		

- K. Please list any contributors to the POTW in the following categories:
May need to contact facility for this information

Food processors (cheese, vegetables, meat, pickles, soy sauce, etc.)	None
Metal Plating/Metal Finishing	None
Car Washes	None
Municipal Maintenance Sheds (salt storage, truck washing, etc.)	None

Laundromats	None
Other presumed commercial or industrial chloride contributors to the POTW	None

L. If the POTW does not have a DNR-approved pretreatment program, is a sewer use ordinance enacted to address the chloride contributions from the industrial and commercial users? If so, please describe.
There is one commercial user in the Sanitary District, a Country Club that was closed for several years and then reopened in 2018 as a venue for weddings and other events. Wastewater flows are significantly less than when the business was in full operation. This business, the Nicoli complex, is required to follow the same sewer user ordinance as residential users. The ordinance as it relates to the Nicoli complex addresses requirements for the one water softener operated by the facility. Requirements are as follows:

- Must keep water softeners programmed at the most efficient settings.
- Must keep interior brine tank clean and bottom free of excessive particulate accumulation.
- Must keep water softener disinfected regularly.
- Must use approved cleaning products formulated for use with softened water.
- Must have soft water units serviced every two years or sooner.
- Yearly water softener inspections.
- Periodic water testing.

Section IV: Pretreatment (complete this section only for POTWs with DNR-Approved Pretreatment Programs. See w:\Variances\Templates and Guidance\Pretreatment Programs.docx)

A. Are there any industrial users contributing chloride to the POTW? If so, please list.
N/A – No DNR-Approved Pretreatment Program

B. Are all industrial users in compliance with local pretreatment limits for chloride? If not, please include a list of industrial users that are not complying with local limits and include any relevant correspondence between the POTW and the industry (NOVs, industrial SRM updates and timeframe, etc)
N/A

C. When were local pretreatment limits for chloride last calculated?
N/A

D. Please provide information on specific SRM activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW
N/A

Section V: Public Notice

A. Has a public notice been given for this proposed variance? ☐ Yes ☐ No

B. If yes, was a public hearing held as well? ☐ Yes ☐ No ☐ N/A

C. What type of notice was given?
☐ Notice of variance included in notice for permit ☐ Separate notice of variance

D. Date of public notice: _____ **Date of hearing:** _____

E. Were comments received from the public in regards to this notice or hearing? (If yes, see notice of final determination) ☐ Yes ☐ No

Section VI: Human Health

A. Is the receiving water designated as a Public Water Supply? ☐ Yes ☒ No

B. Applicable criteria affected by variance: No human health criteria for chloride

C. Identify any expected impacts that the variance may have upon human health, and include any citations:
None

Section VII: Aquatic Life and Environmental Impact

A. Aquatic life use designation of receiving water: Limited forage fish community

B. Applicable criteria affected by variance: 395 mg/L chronic toxicity criterion and 757 mg/L acute toxicity criterion

C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:

At the weekly average variance limit of 576 mg/L, the effluent concentration would exceed the mean chronic value for *Ceriodaphnia* (417 mg/L)

D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations:

County	Species	Status
La Crosse	<i>Acris blanchardi</i>	WI – Endangered
La Crosse	<i>Chlidonias niger</i>	WI – Endangered
La Crosse	<i>Hiodon alosoides</i>	WI – Endangered
	<i>Platanthera leucophaea</i>	WI – Endangered & Federal Threatened
La Crosse	<i>Sistrurus catenatus</i>	WI – Endangered & Federal Threatened
La Crosse	<i>Buteo lineatus</i>	WI – Threatened
La Crosse	<i>Ardea alba</i>	WI – Threatened
La Crosse	<i>Callitriche heterophylla</i>	WI & Federal – Threatened
La Crosse	<i>Eptesicus fuscus</i>	WI – Threatened
La Crosse	<i>Glyptemys insculpta</i>	WI – Threatened
La Crosse	<i>Myotis lucifugus</i>	WI – Threatened
La Crosse	<i>Myotis septentrionalis</i>	WI & Federal – Threatened
La Crosse	<i>Perimyotis subflavus</i>	WI – Threatened
La Crosse	<i>Platanthera flava</i> var. <i>herbiola</i>	WI – Threatened
La Crosse	<i>Simpsonia</i> <i>ambigua</i>	WI – Threatened

Citation: U.S. Fish & Wildlife Service – Environmental Conservation Online System (<http://www.fws.gov/endangered/>) and National Heritage Index (<http://dnr.wi.gov/topic/nhi/>)

Section VIII: Economic Impact and Feasibility

A. Describe the permittee's current pollutant control technology in the treatment process:

Maple Grove Estates Sanitary District owns and operates an activated sludge aeration system with an annual average design flow of 0.035 MGD, and an actual annual average flow of 0.009 MGD over the past three years. The waste is domestic and comes from the area condominiums and homes. The Maple Grove Country Club and golf course was closed in September 2013. In 2018, the club reopened on a limited basis as a venue for celebrations. The plant was built in 1992 and is currently operating below capacity. When needed, excess sludge is hauled to the West Salem Wastewater Treatment Facility.

B. What modifications would be necessary to comply with the current limits? Include any citations.

Upgrading Maple Grove's treatment plant to include a reverse osmosis (RO) treatment system for removing chloride from the wastewater effluent would allow the permittee to comply with the chloride WQBELs.

C. How long would it take to implement these changes?

Per DNR plan reviewer, preparing and submitting a facility plan, final plans and specifications, initiating construction of the RO upgrade and completing construction would take approximately three years.

D. Estimate the capital cost (Citation): \$39,375 (Citation: Chloride Variance Application)

E. Estimate additional O & M cost (Citation): \$165,827 (total annual O&M cost including RO system O&M and RO reject water transportation and disposal costs).

Citation: Wisconsin uses a "Variance Municipal Cost Chloride RO" spreadsheet that is based on EPA's 1995 Interim Economic Guidance to estimate the annual capital and operation and maintenance cost of installing and operating an RO treatment system (included with variance submittal).

F.	Estimate the impact of treatment on the effluent substance concentration, and include any citations:	A RO treatment system could remove virtually all chloride from Maple Grove's treatment plant discharge.	
G.	Identify any expected environmental impacts that would result from further treatment, and include any citations:	Installing a RO treatment system at the wastewater treatment plant would cause temporary environmental impacts from construction activity. Also, operating a RO treatment system creates a concentrated chloride brine solution causing impacts based on disposal of brine. These include air pollution impacts from trucking brine and increased chloride impacts at the point where brine is discharged.	
H.	Is it technically and economically feasible for this permittee to modify the treatment process to reduce the level of the substance in the discharge?	<div style="text-align: right;"> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown </div> <p>Reverse Osmosis treatment for Maple Grove's effluent to meet the WQBELs is technically feasible. However, it is not economically feasible. See DNR variance application and RO screening tool for costs of reverse osmosis. Use of reverse osmosis at the WWTF was evaluated; the resulting total cost for sewer user rates was estimated to result in an average cost to households that would be 6.74% of the MHI. An increase of this magnitude would cause substantial and widespread adverse social and economic impacts in the area where the discharge is located.</p> <p>Lime softening treatment of Maple Grove's water supply is technically feasible and would potentially enable the treatment plant to meet the chloride WQBEL. However, lime softening is not economically feasible. See the DNR variance application for the Economic Eligibility Tool for facilities that have no significant drinking water infrastructure. Due to water hardness in private wells, most residents use water softeners. Since Maple Grove is not serviced by a centralized municipal water supply, the cost estimate for the cost of current wastewater treatment, cost of hook ups, and cost of pipes was evaluated. The cost for the installation of this infrastructure to sewer user rates was estimated to result in an average cost to households that would be 9.78% of the MHI. Since this cost is over 2% the cost to construct a lime softening plant was not evaluated. An increase of this magnitude would cause substantial and widespread adverse social and economic impacts the area where the discharge is located.</p>	
I.	If treatment is possible, is it possible to comply with the limits on the substance?	<div style="text-align: right;"> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown </div> <p>As shown above, upgrading the Maple Grove wastewater treatment system to meet the water quality standards for chloride is technically feasible, however, the cost of such and upgrade is economically infeasible.</p>	
J.	If yes, what prevents this from being done? Include any citations.	Treatment is not economically feasible.	
K.	List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations:	During previous permit terms the permittee implemented a Chloride Pollutant Minimization Program/Source Reduction Measures (PMP/SRM) Plan that focused on actions to reduce chloride discharges to the treatment plant from the regeneration of residential and commercial water softeners (there is one commercial business in the Sanitary District, a country club) and sewage collection system maintenance to reduce influent and inflow of chlorides from road salt in the winter.	
Section IX: Compliance with Water Quality Standards			
A.	Describe all activities that have been, and are being, conducted to reduce the discharge of the substance into the receiving stream. This may include existing treatments and controls, consumer education, promising centralized or remote treatment technologies, planned research, etc. Include any citations.	<ul style="list-style-type: none"> • Distribute public informational materials on water softener installation, operation and maintenance requirements in the sewer use ordinance, including: <ul style="list-style-type: none"> • On demand water softeners are required in all new construction. • Replacement of old water softeners must be on demand units with high efficiency rate. 	

- Must keep water softeners programmed at the most efficient settings.
- Must keep interior brine tank clean and bottom free of excessive particulate accumulation.
- Must keep water softener disinfected regularly.
- Must use approved cleaning products formulated for use with softened water.
- Must have water softening units serviced every two years or sooner.
- All residents are subject to yearly water softener inspections.
- All residents may be water tested periodically.
- Inspected residential water softeners and inventory type (demand or timed).
- Discussed with water softener suppliers water softener efficiency in relation to high iron concentrations in water supply wells.
- Investigated sewage collection system infiltration and inflow, such as surveying manholes with open pick holes and inspecting manhole chimneys.
- Cleaned out aeration basin to see if accumulated solids were a contributing source of chlorides.

B. Describe all actions that the permit requires the permittee to complete during the variance period to ensure reasonable progress towards attainment of the water quality standard. Include any citations.

Comply with interim chloride limits of 1,015 mg/L as a daily maximum and 576 mg/L as a weekly average. Perform the actions in the approved Chloride Source Reduction Measures (SRM) Plan dated April 2020 as summarized below and submit annual chloride progress reports (4) and a final chloride progress report. The reports shall summarize progress implementing chloride SRM activities and include an analysis of chloride effluent concentrations and mass discharge of chloride.

Source Identification Efforts

- Test the water supply from at least three (3) homes prior to softening equipment to determine background chloride concentrations in the water supply.
- Test for chlorides at several points within the wastewater treatment facility to determine if I/I is occurring as a result of aging infrastructure and recent cleaning of aeration basins and digester at the plant.
- Document all road salt usage on the roads located within the District.
- Conduct random sampling of the Country Club discharge to determine chloride loadings coming from the facility both during events and non-events.

Water Softener Related Actions

- Work with residents to replace existing time-based water softeners with the goal of updating at least 10 softeners by the end of the permit term.
- Investigate feasibility of residential softening operations to be reduced to softening hot water only.
- If softening operations can be reduced to hot water only, develop program to implement and begin implementation.
- Conduct annual inspections of water softeners at residents and Country Club to ensure proper settings and operation and maintenance.
- Investigate feasibility of requiring annual maintenance of water softening units, specifically at the Country Club.
- Work with the Country Club to document softening/conditioning equipment and timing of regeneration.
- Work with Country Club on alternative discharge options for water softener regeneration water (i.e. store and haul to another facility, land apply, etc.)
- Investigate water softener technology improvements and report on findings.

Other SRM Efforts	
<p>a. Minimize to the maximum extent practically, all road salt usage on roads within the District.</p> <p>b. Continue to work on CMOM efforts and provide an annual evaluation of flow from infiltration and inflow to the WWTF.</p>	
Section X: Compliance with Previous Permit (<i>Variance Reissuances Only</i>)	
A. Date of previous submittal: <u>August 30, 2013</u>	Date of EPA Approval: <u>April 22, 2014</u>
B. Previous Permit #: <u>WI-0036552-05-0</u>	Previous WQSTS #: _____ (EPA USE ONLY)
C. Effluent substance concentration: <u>827 mg/L 4-day P99 (6/1/2014 – 12/31/2018)</u>	Variance Limit: <u>576 mg/L</u>
D. Target Value(s): <u>474 mg/L</u>	Achieved? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partial
E. For renewals, list previous steps that were to be completed. Show whether these steps have been completed in compliance with the terms of the previous variance permit. Attach additional sheets if necessary.	
Condition of Previous Variance	Compliance
Monitor chloride effluent concentrations monthly.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Maintain chloride effluent concentrations below an interim limit of 576 mg/L. Note, when the country club closed, the trend in chlorides decreased, but when it opened back up, the trend increased again.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Identify any new or additional sources of chloride to the sewer system.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Educate homeowners on the impact of chloride from residential softeners, discuss options available for increasing softener salt efficiency, and request voluntary reductions.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Recommend residential softener tune-ups on a voluntary basis via addition to their Ordinance in 2016.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Continue, as appropriate, to educate licensed installers and self-installers of softeners on providing water, that has not been softened on-site, for outside faucets of residences.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Survey of manholes for pickhole ports, corking/plugging when discovered to reduce salt meltdown from entering the collection system.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No